







This activity is adapted from *Nature Unbound: The Impact of Ecology on Missouri and the World*. *Nature Unbound* is the high school unit of Discover Nature Schools, the Missouri Department of Conservation's conservation education program now adopted in over 800 Missouri schools.

# Essential Activity 5.1 What Would (Should) You Do?

Estimated time (1) 50-minute class session

# **Objectives**

Students will be able to:

- 1. Identify human activities that threaten species with extinction.
- 2. Explain how environmental factors (habitat loss, climate change, pollution, introduction of invasive species) can be agents of natural selection.
- 3. Given a scenario describing a natural environmental change or human activity that adversely affects an ecosystem, describe its impact on biodiversity and hypothesize why a given species may or may not survive.
- 4. Describe the threat posed by invasive species and strategies resource managers use to slow their spread.

### **Teacher Notes**

Students will analyze possible human influences on the status of species found in the schoolyard ecosystem. Students can work individually or in small groups to collect data in the schoolyard ecosystem. If the schoolyard ecosystem is large, students could be assigned predetermined study areas.

At the end of this activity and during the discussion of possible solutions to negative human influences on species found in the schoolyard ecosystem, students should include some realistic solutions that they could accomplish. Students should discuss what they can do to make a difference.

#### **Materials**

Pencils Student science notebooks Nature Unbound (Figure 5.4 on p. 66 of the student book) Schoolyard Ecosystem Chart

#### **Procedure**

#### Part 1

- 1. For background, students should read Chapter 5 of the *Nature Unbound* student book, "Extinction: Causes and Consequences."
- 2. In class, discuss the consequences of human activity in Missouri.
- 3. Create a Human Influences List including but not limited to:
  - a. Pollution (acid rain, toxins, bacterial contamination, nutrient build up, trash, etc.)
  - b. Habitat destruction, alteration, deforestation, fragmentation, homogenization
  - c. Over harvest of resources
  - d. Expanding urbanization
  - e. Human affluence (Note: As affluence increases there is an increase in the per capita resource use.)
  - f. Introduction of exotic invasive species
- 4. Have students discuss positive influences and add them to their list. Include restoration of habitat if students do not include it.

#### Part 2

- 5. Have students copy the Human Influences List into their science notebooks.
- 6. Have students prepare and complete their science notebook headings.
- 7. In the schoolyard ecosystem, students may work individually or in small groups. Assign pre-selected study areas to students, if necessary.
- 8. Students should list the species they observe and refer to the data collected in Essential Activity 1.1.
  - a. Do they see the same species? Why or why not?
- 9. Students should create a chart referencing Figure 5.4 on page 66 of *Nature Unbound* student book or use the 5.1 Schoolyard Ecosystem Chart:
  - a. List species observed.
  - b. Make best "guesses" as to whether each species would be at risk due to their traits:
    - i) generalist vs. specialist
    - ii) large population vs. small population
    - iii) extensive range vs. restrictive range
  - c. List human influences observed and the species affected by each.
  - d. Include any invasive species observed.
- 10. Have each student or group report their findings from the schoolyard activity.
- 11. Have students list all human influences observed in the schoolyard ecosystem and compare and contrast human influences observed. For each negative human influence listed, have students discuss solutions and decide which of the suggested solutions they could actually accomplish. Prompt students to understand that solutions may be positive (or negative) influences on an environment.

#### Wrap up

- 1. Predict how schoolyard ecosystem species might be affected:
  - a. If the school area was improperly sprayed with an insecticide.
  - b. If a particular herbicide that acts as an Endocrine Disruptive Compound (disrupting hormonal balances) is used to control weeds in crop fields adjacent to an aquatic ecosystem.

- i) How might this affect species of fish and amphibians found in the local aquatic ecosystem?
- ii) What are the long-term effects on these species?
- iii) What could you as a member of the community do to alleviate this problem?
- 2. Bush honeysuckle is an invasive species brought to the United States from Asia as a benefit for wildlife. Since its introduction, it has aggressively colonized in most of Missouri. It competes for light and space with native species, thus reducing biodiversity.
  - a. What effects might bush honeysuckle have on the environment if left unchecked?
  - b. What might be the effect:
    - i) If the area were improperly sprayed with an herbicide?
    - ii) If an Asian herbivore that eats bush honeysuckle were introduced into the environment?
  - c. What are some other possible solutions to this problem?
- 3. Compare extinctions today to mass extinctions in the past. Which of the five mass extinctions in the past is most like today's rate of extinction?

# **5.1 Schoolyard Ecosystem Chart**

Species	At risk? Yes/No	Potentially "Risky" Traits	Human Influences Observed (Match with affected species.)	ü Invasive Species
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